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ABSTRACT

To be used in conjunction with the "Nutrition Education--Choose Well, Be Well" curriculum series, this resource manual is designed to help teachers in preschools, kindergartens, and grades 1 through 6 acquire the proficiency necessary for providing effective nutrition education. The document is based on the goals set forth in the Health Instruction Framework for California Public Schools and topics identified in the publication entitled "Minimum Proficiency Levels for Nutrition Education in California Schools." Chapter 1 of the document presents introductory information about the manual's objectives and organization, while chapters 2 through 6 cover the five topics identified in the California nutrition education minimum competency guidelines: food choices, factors influencing food choices, food-related careers, consumer competencies, and food handling. To ensure systematic achievement of the goals of California's nutrition education program, minimum proficiency levels for students were developed for each of these topics and specific questions are asked so that the teacher can check retention of key information. Answers are provided after each set of questions. (MP)

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Nutrition Education Choose Well Be Well

A Resource Manual for Preschool, Kindergarten, and Elementary Teachers

CALIFORNIA STATE DEPARTMENT OF EDUCATION
Wilson Riles, Superintendent of Public Instruction
Sacramento, 1982

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1982

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A list of other publications available from the Department can be found on page 33 of this publication.

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Virginia Leung Jang, Public Health Nutrition Consultant, California Department of Health Services

Peggy Macaulay, teacher, Country High School, Vacaville Unified School District

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Joyce Vermeersch, Special Consultant, California State Department of Education

Mary Tobias Weaver, Nutrition Education Specialist, California State Department of Education

Foreword

National attention is being focused more and more on the importance of nutrition for good health. Studies have shown that nutrition plays a direct role in the overall development of children's mental and physical abilities. Therefore, it is critical that we focus on the important task of improving nutrition and the quality of our children's lives through an ongoing, effective nutrition education program. To accomplish this task, we must help change children's attitudes toward food, modify their eating habits, and improve their ability to use nutrition information.

California, through the enactment of state legislation and participation in federal child nutrition programs, has made a major commitment to nutrition education. With financial support provided by the Child Nutrition Facilities Act (Senate Bill 120) and both the National School Lunch Act and Child Nutrition Amendment (Public Law 95-166), the state has established a comprehensive nutrition education and training program.

One of the objectives of the Nutrition Education and Training Program is to teach children, through a positive daily lunchroom experience and appropriate classroom reinforcement, the value of a nutritionally adequate diet. To be effective, nutrition education efforts must combine the expertise and efforts of teachers, food service professionals, and parents. To build bridges between food service and instructional programs and between home and school is a challenge to those persons who accept the responsibility for nutrition education. I am hopeful that this publication and the others in the *Choose Well, Be Well* curriculum series will be helpful to those accepting the challenge to build these most important bridges to good health for our children.

Superintendent of Public Instruction

2—79851

Preface

This resource manual is designed for persons implementing nutrition education programs in preschools, kindergartens, and grades one through six. This manual is to be used in conjunction with the *Nutrition Education—Choose Well, Be Well* curriculum series. The document is based on the goals set forth in the *Health Instruction Framework for California Public Schools* and the topics that are identified in the publication entitled *Minimum Proficiency Levels for Nutrition Education in California Schools.*

The background information presented in the resource manual is intended to give teachers an insight into the lessons in the *Choose Well, Be Well* curriculum series and to help them acquire the proficiency level necessary for providing effective nutrition education.

We hope that the document will be useful to teachers in helping students obtain the knowledge and skills they need to make wise food choices that will contribute to their overall health and well-being throughout life.

WILLIAM D. WHITENECK
Deputy Superintendent
for Administration

L. GENE WHITE
Director
Office of Child Nutrition
Services

BARRY GRIFFING
Associate Superintendent
Division of Child Development
and Nutrition Services

AMANDA DEW MELLINGER
Coordinator, Nutrition Education
and Training Program

Introduction

New directions in life-styles in recent years have led to changes in eating habits and nutritional practices. Studies show that most individuals do not follow good nutritional practices and that more attention must be given to the relationship between nutrition and health. Therefore, nutrition educators must assume the important task of teaching individuals how to make food choices that will contribute to their overall health and well being.

In an attempt to improve nutrition in the schools, the Department of Education has developed the curriculum series entitled *Nutrition Education—Choose Well, Be Well.* The publications have been developed by the Department to present accurate and current nutrition information to students, to facilitate an awareness of the students' own nutrition-related values, and to provide students with an opportunity to share their opinions and attitudes with other persons.

The Department has also prepared this resource manual for use by teachers and food service personnel in conjunction with the lessons in the curriculum series. The manual contains background information on the subject matter of the lessons, but it is not intended to be used as an instructional text. It is hoped that the document will help teachers attain the minimum proficiency level required for nutrition education.

The resource manual is divided into six chapters. Chapter one presents introductory information, and chapters two through six cover the five topics identified in *Minimum Proficiency Levels for Nutrition Education in California Schools:*

Food Choices—Daily food intake is related to the attainment of optimum health.

Factors Influencing Food Choices—Life-styles, peers, and individual family resources reflect similarities and differences in food choices.

Food-Related Careers—Needs, roles, responsibilities, and educational requirements affect choices in food and health nutrition-related careers.

Consumer Competencies—Effective utilization of existing resources may enhance the potential for satisfying individual and family nutritional needs and wants.

Food Handling—The quality and safety of foods are influenced by the handling, processing, and preparing of foods.

Minimum proficiency levels for students were developed for each of the above topics to ensure the systematic achievement of the goals of California's nutrition education program, as set forth in the *Health Instruction Framework for California Public Schools.* These goals are:

1. To develop an understanding that eating patterns are dependent upon interrelationships among physical, social, psychological, economic, and cultural factors
2. To consider alternatives in meeting nutritional needs and to decide on various ways of achieving good nutrition within these eating patterns
3. To develop eating patterns which contribute to wellness

Specific questions are asked after the presentation of each content area so that the teacher can check retention of key facts. Answers are provided after each set of questions.

Quiz

1. **What are the three goals of nutrition education?**
   a. _____
   b. _____
   c. _____
2. **What are the five topics in nutrition education?**
   a. _____
   b. _____
   c. _____
   d. _____
   e. _____

Answers

1. The three goals of nutrition education are:
   a. To develop an understanding that eating patterns are dependent upon interrelationships among physical, social, psychological, economic, and cultural factors
   b. To consider alternatives in meeting nutritional needs and decide on various ways to achieve good nutrition within these eating patterns
   c. To develop eating patterns which contribute to wellness
2. The five topics in nutrition education are:
   a. Food Choices
   b. Factors Influencing Food Choices
   c. Food Related Careers
   d. Consumer Competencies
   e. Food Handling

Food Choices

Food choices are important because they have an effect on every individual's energy level, susceptibility to certain health problems, and emotional and physical fitness. Individuals cannot be forced to select a nutritionally adequate diet or to change certain ideas about eating. However, they should realize that food decisions made today may have an effect on the quality of their future lives.

The Body and Food

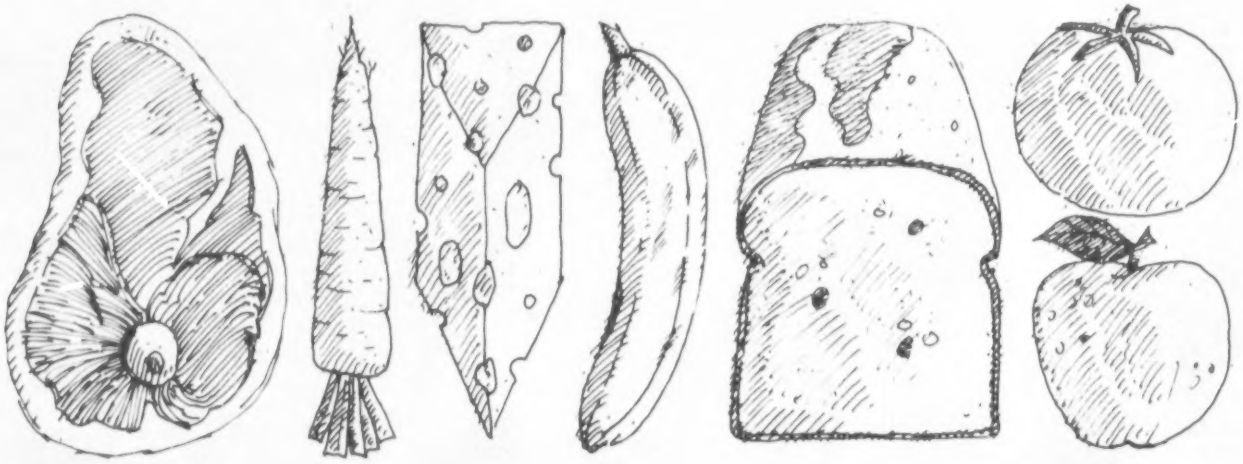
The nutrients contained in food are used for energy, for growth, for maintenance and repair of body tissue, and for the regulation of body functions.

Food is necessary to provide ***energy*** for the body's activities, both internal and external. Examples of internal activities are the beating of the heart, the breathing action of the lungs, and the digesting of food. Examples of external activities are playing, running, and swimming.

Food is also necessary for ***growth.*** Most people weigh about seven pounds at birth. By the time they reach adulthood, their weight will have increased 15 to 30 times. The nutrients in food enable body cells to multiply, thus causing growth. Without nutritious food, the body would not grow adequately.

The nutrients in food are necessary for ***maintenance and repair of body tissue.*** An example of these activities is the replacement of body cells, which are constantly being worn down.

Finally, food is necessary for the ***regulation of body functions,*** such as the maintenance of normal body temperature, the movement of fluids, the control of the balance between acid and base, and the coagulation of the blood.



Quiz

List four reasons why the body needs the nutrients obtained from food.

1. _____
2. _____
3. _____
4. _____

Answer

Four reasons why the body needs nutrients obtained from food are:

1. Energy
2. Growth
3. Maintenance and repair of body tissue
4. Regulation of body functions

Nutrients

Nutrients are substances in foods that are necessary not only for growth but also for energy, maintenance and repair of body tissues, and regulation of body functions. Although not all nutrients have been identified and the relationship of the nutrients to each other is not completely understood, it is known that each nutrient has a specific function and that no nutrient acts alone. Thus, one should consume many different nutrients each day by eating a variety of foods at each meal.

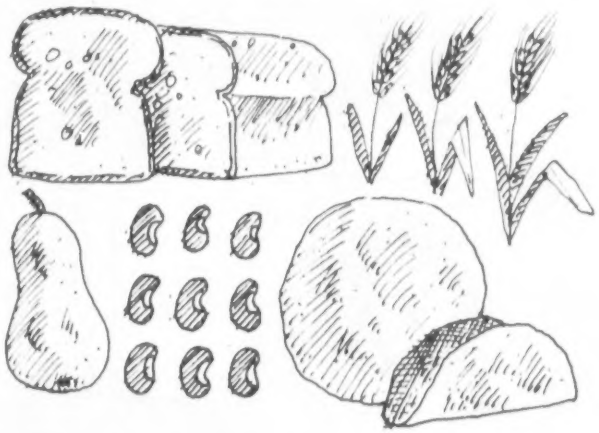
All of the different nutrients fall into six major groups: protein, carbohydrate, fat, vitamins, minerals, and water. Proteins, carbohydrates, and fats are classified as macronutrients, because they are needed in large amounts. The macronutrients supply energy and are important sources of the body's chemical building materials. Vitamins and minerals are important for building and regulating, but they do not supply energy. They are classified as micronutrients because they are needed in small amounts.

Proteins are essential to life and are found in every part of the body. They are made up of chemical compounds called amino acids. More than 20 different amino acids exist; nine of these are called "essential" and must be taken into the body through food consumed. The other amino acids can be manufactured in the body if the essential amino acids are in sufficient supply.

High quality proteins, called complete proteins, contain all the essential amino acids in amounts needed by the body to maintain life and provide for normal growth. As a general rule, proteins from animal sources, such as meat, fish, poultry, milk, and eggs, are complete. Generally, proteins from plant sources, such as vegetables, cereals, grains, nuts, seeds, and legumes, are incomplete or partially complete because they lack one or more essential amino acids. The protein quality of plant proteins can be improved by combining them with an animal source (e.g., cereal with milk) or by using two different plant proteins, each lacking a different essential amino acid, so that each supplies the one missing in the other (e.g., rice and beans). The principle of combining plant with animal protein and combining various plant proteins to increase a protein's nutritive value is known as complementing food protein.

The body needs protein as a building material for all living cells, including those in muscles, bones, and blood. Protein is also essential for enzymes that help break down food into nutrients for the body to use. If more protein is consumed than the body needs, it cannot be stored for future use and will be broken down and used for energy or stored as fat. Some foods that are high in protein are meat, milk, cheese, eggs, fish, poultry, dried beans and peas, nuts, and seeds.

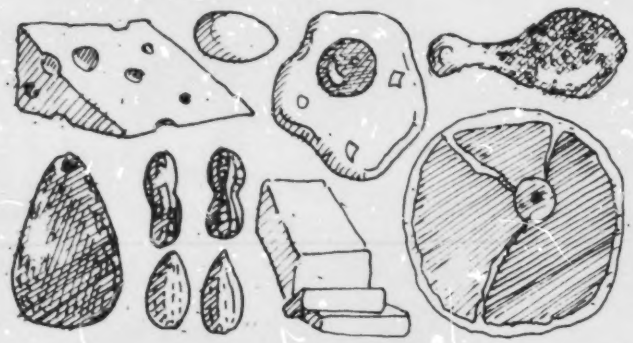
Carbohydrates provide energy that the body needs. Foods that are high in carbohydrates are of plant origin, such as wheat, corn, rye, rice, and oat grains, and products made from cereals, such as breads, cakes, pastries, and cookies. By a process of photosynthesis, the plant takes water, carbon dioxide, and the energy from the sun and forms glucose (a sugar), which is the simplest form of carbohydrate. Plants combine sugars to form starches and fiber. A plant forms starches for its own food so that the seeds can survive until the plant is able to grow its own root system and leaves. Fiber, generally a structural component of plants, is largely undigested by man. However, it aids in normal passage of waste products to elimination.



Fats are important because they are a source of both energy and the essential fatty acids which the body cannot produce. In addition, fats serve as insulation and provide protective cushions for the organs. Fats also add variety and flavor to many foods and carry vitamins A, D, E, and K. The richest sources of fats in the diet are vegetable oils and animal fats.

Fats contain both saturated and unsaturated fatty acids. Animal fats generally contain a higher ratio of saturated fatty acids and are solid at room temperature. Those rich in unsaturated fatty acids are generally vegetable oils and are liquid at room temperature. Both saturated and unsaturated fats contain the same number of calories.

If insufficient carbohydrates and fats are eaten, the body will use dietary protein to meet its energy needs.



Vitamins have a number of different specific functions, but all are necessary in small amounts for good health and normal growth and development.

Vitamins are classified as water-soluble or fat-soluble. Water-soluble vitamins are those which dissolve in water and are readily excreted through the kidneys in body fluids. Because the body stores few of these vitamins, adequate quantities of the water-soluble vitamins must be supplied daily in food. All the vitamins are water-soluble except vitamins A, D, E, and K, which are fat-soluble. The fat-soluble vitamins, which are not readily dissolved in water or body fluids, can be stored in the body. It is possible for the body to store excessive amounts of these vitamins; however, excesses of fat-soluble vitamins generally occur only when vitamin supplements are added to the diet.

All vitamins are important, including vitamin A and vitamin C. Vitamin A maintains healthy tissues in the mouth, throat, and lungs. It also promotes healthy skin and helps the body resist infection. Vitamin A, important for night vision, helps the eyes adjust to light. Good food sources of vitamin A are dark green and deep yellow vegetables, whole or fortified milk, eggs, organ meats, and most cheeses.

Vitamin C, or ascorbic acid, is important in the formation and repair of bones and teeth. Vitamin C also helps in the healing of wounds and helps the body combat infection, and it is needed for the cementing material that holds the body cells together. Good food sources of vitamin C are citrus fruits, such as oranges, grapefruits, tangerines, lemons, and limes. Other sources of vitamin C are strawberries, cantaloupe, tomatoes, broccoli, and red and green peppers.

Other important vitamins include the B vitamins that are necessary for every cell in the body, because they are part of the enzyme systems which help the body utilize food. Thiamin, riboflavin, niacin, vitamin B-6, pantothenic acid, biotin, folacin, and vitamin B-12 are vitamins included in the B Complex family.

Minerals are inorganic elements which are essential in small quantities for life processes. Plants have the ability to draw minerals from the ground as they grow, and a person gets minerals directly from plants or indirectly from animals that have eaten plants. Minerals are necessary for building, maintaining, and repairing the body and for regulating the body processes. Some of the important minerals are calcium, iron, zinc, magnesium, copper, iodine, sodium, potassium, phosphorous, fluoride, and chloride.

Calcium is needed to build, repair, and maintain bones and teeth. Calcium is also found in the bloodstream and regulates the clotting of blood and the activities of the heart, muscles, and nerves. The best food sources of calcium are milk and milk products, but calcium is also found in dark green leafy vegetables.

Iron, which is part of the hemoglobin in red blood cells, enables hemoglobin to carry oxygen from the lungs to the cells and carbon dioxide from the cells to the lungs. Liver is the best source of iron. However, all meat, fish, and poultry supply iron. Green leafy vegetables and dried fruits are also good sources of iron.

Water is not considered a food, but it is a nutrient essential to life. Water is the basic part of blood and tissue fluids. About 50 to 75 percent of the body is composed of water. It carries the nutrients to the cells and removes the waste products from the cells. Water also helps the body maintain normal body temperature. In addition to water itself, all liquids and most foods contribute to the body's water requirements.

Quiz

1. What is a nutrient?

_____

_____

2. What are the six nutrient groups?

_____

_____

3. Why should one's diet contain a variety of foods each day?

_____

_____

4. List one good food source and one function of each of the following:

Nutrient	Food source	Function
Protein	_____	_____
	_____	_____
Vitamin A	_____	_____
	_____	_____
Vitamin C	_____	_____
	_____	_____
Calcium	_____	_____
	_____	_____
Iron	_____	_____
	_____	_____

Answers

1. Nutrients are the substances in food necessary for energy, growth, maintenance and repair of body tissue, and regulation of body functions.

2. The six nutrient groups are protein, carbohydrate, fat, vitamins, minerals, and water.

3. It is important to eat a variety of foods each day, because no one food or food group contains all the nutrients necessary for good health.

4. Nutrient	Food source	Function
Protein	Meat, dried beans, fish, eggs, poultry	Provides building materials for all living cells, including muscles, bones, and blood
Vitamin A	Dark green and deep yellow vegetables	Promotes healthy skin and helps the body fight infection; important for night vision
Vitamin C	Citrus fruits, strawberries, cantaloupe, broccoli	Aids in formation and repair of bones and teeth and helps combat infection
Calcium	Milk and milk products, dark green leafy vegetables	Builds, repairs, and maintains bones and teeth; regulates blood clotting and activities of the heart, muscles, and nerves
Iron	Liver, meat, fish, poultry, dark green leafy vegetables, dried fruits	Part of hemoglobin in red blood cells

Calories

In addition to the six major nutrient groups (proteins, carbohydrates, fats, vitamins, minerals, and water), calories play an important role in the nutritional status of the body. A calorie is actually a unit of measurement which measures the amount of heat needed to raise one kilogram of water 1 degree Celsius. Calories are a simple way of stating the amount of energy provided from a food. For example, two tablespoons of sugar have 90 calories; this means that when the body metabolizes two tablespoons of sugar, 90 calories of energy will be produced.

Our bodies need energy. Ideally, enough calories are provided through the food we eat to maintain ideal weight. The amount of calories a person needs depends upon one's age, sex, height, body build, and amount of activity. Those who eat more calories than their bodies need gain weight, and the excess is stored as fat. Those who eat fewer calories than they need lose weight.

Quiz

1. What is a calorie?

   _____

2. What is the result of consuming more calories than the body needs?

   _____

Answers

1. A calorie is a measure of the energy value of foods.
2. Weight gain is the result of one's consuming more calories than the body needs.

Digestion

Before the body can use the nutrients contained in food, the food must be digested. Digestion is the breaking down of food into substances which can be passed into the bloodstream for use by the cells.

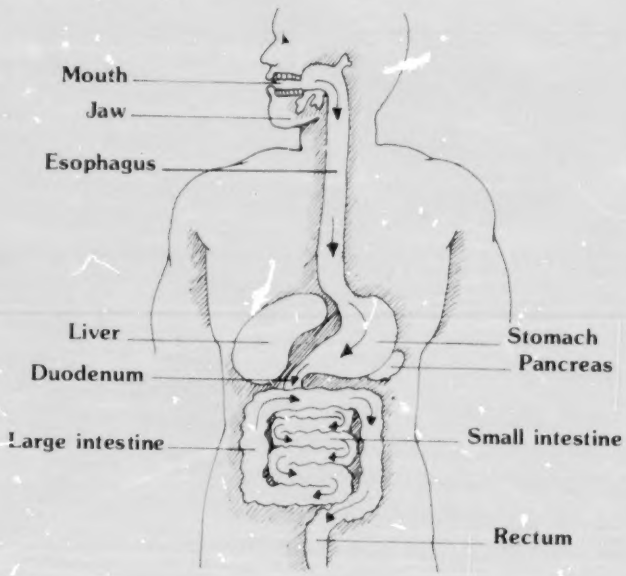
Digestion of food in the body begins when the food is chewed. Enzymes in the saliva in the mouth also break down the food.

Digestion continues to occur when food is swallowed and passes from the mouth to the stomach by way of the esophagus. During this time, the food is pushed toward the stomach by the muscles in the esophagus.

The next step of digestion occurs in the stomach, where food is mixed with acid and is broken down further by the churning action of the stomach walls. How long food remains in the stomach varies with the person and the diet. However, food generally leaves the stomach in three to four and one-half hours.

The food then goes to the small intestine. By now, the food is in a highly liquefied form, and enzymes secreted by the pancreas and the small intestine break it down further. As food moves through the small intestine, the body begins to absorb the nutrients the food contains.

Finally, what has not been absorbed is concentrated in the large intestine and is eliminated by the body.



Quiz

List the steps of digestion from the time food is taken into the body until it is eliminated.

_____

_____

_____

_____

Answer

The digestive process occurs as follows:

1. Chewing in the mouth
2. Swallowing and passing through the esophagus
3. Mixing with acid in the stomach
4. Breakdown by enzymes and absorption in the small intestine
5. Concentration in the large intestine for elimination

Recommended Dietary Allowances (RDA)

Recommended Dietary Allowances (RDA) are national standards which establish nutrient requirements for groups of healthy people. The RDA is determined by a committee of the Food and Nutrition Board of the National Academy of Sciences. Recommended Dietary Allowances are periodically revised as new research provides better data on nutrient needs. The most recent revision of the RDA was published in 1980 (Tables 1 and 2).

The nutrients for which recommendations have been made are protein, vitamin A, vitamin D, vitamin E, ascorbic acid, folacin, niacin, riboflavin, thiamin, vitamin B-6, vitamin B-12, calcium, phosphorus, iodine, iron, magnesium, and zinc. The 1980 revision of the RDA also includes discussions on the needs for other trace minerals and carbohydrate, fat, and fiber components of the diet.

Recommended Dietary Allowances are given for infants and children; for males and females in the age groups of eleven through fourteen, fifteen through eighteen, nineteen through twenty-two, twenty-three through fifty, and over fifty; and for pregnant and lactating women. The RDA is intended to provide for individual variations among most healthy persons who live in the United States. For this reason a person does not necessarily have a nutritional deficiency because his or her diet fails to meet the RDA. The RDA is intended to be used as a guide for planning food supplies for groups of people. For example, the goal of the school lunch pattern is to supply one-third of the RDA for a child, aged nine to twelve years. The remaining two-thirds RDA is supposed to be supplied by other meals and snacks that children eat during the day. The theory is that if diets meet 100 percent of the RDA, it will be highly unlikely that people will suffer from a nutritional deficiency unless they are sick or have a condition that increases nutrient needs or interferes with nutrient utilization.

A variation of the RDA is the U.S. Recommended Daily Allowances (U.S. RDA) that appear on food labels. To ensure a U.S. RDA high enough for almost everyone, the RDA for the sex-age category with the highest allowance was selected for most nutrients. The U.S. RDA, therefore, is not meant to be used to determine whether or not a person is getting enough nutrients from foods. Instead, these standards are intended as an aid for comparing the relative nutritional values of different food products.

Quiz

What is the meaning of Recommended Dietary Allowances?

_____

_____

Answer

Recommended Dietary Allowances (RDA) are nutrient guidelines for specific ages and sexes of people in the United States.

Table 1

Food and Nutrition Board, National Academy of Sciences-National Research Council
RECOMMENDED DAILY DIETARY ALLOWANCES[1], Revised 1980
Designed for the maintenance of good nutrition of practically all healthy people in the U.S.A.

							Fat-soluble vitamins			Water-soluble vitamins							Minerals					
	Age (years)	Weight (kg)	Weight (lbs)	Height (cm)	Height (in)	Protein (g)	Vitamin A (μg R E)[2]	Vitamin D (μg)[3]	Vitamin E (mg α T E)[4]	Vitamin C (mg)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg N E)[5]	Vitamin B-6 (mg)	Folacin[6] (μg)	Vitamin B-12 (μg)	Calcium (mg)	Phosphorus (mg)	Magnesium (mg)	Iron (mg)	Zinc (mg)	Iodine (μg)
Infants	0.0-0.5	6	13	60	24	kg×2.2	420	10	3	35	0.3	0.4	6	0.3	30	0.5g[7]	360	240	50	10	3	40
	0.5-1.0	9	20	71	28	kg×2.0	400	10	4	35	0.5	0.6	8	0.6	45	1.5	540	360	70	15	5	50
Children	1-3	13	29	90	35	23	400	10	5	45	0.7	0.8	9	0.9	100	2.0	800	800	150	15	10	70
	4-6	20	44	112	44	30	500	10	6	45	0.9	1.0	11	1.3	200	2.5	800	800	200	10	10	90
	7-10	28	62	132	52	34	700	10	7	45	1.2	1.4	16	1.6	300	3.0	800	800	250	10	10	120
Males	11-14	45	99	157	62	45	1000	10	8	50	1.4	1.6	18	1.8	400	3.0	1200	1200	350	18	15	150
	15-18	66	145	176	69	56	1000	10	10	60	1.4	1.7	18	2.0	400	3.0	1200	1200	400	18	15	150
	19-22	70	154	177	70	56	1000	7.5	10	60	1.5	1.7	19	2.2	400	3.0	800	800	350	10	15	150
	23-50	70	154	178	70	56	1000	5	10	60	1.4	1.6	18	2.2	400	3.0	800	800	350	10	15	150
	51+	70	154	178	70	56	1000	5	10	60	1.2	1.4	16	2.2	400	3.0	800	800	350	10	15	150
Females	11-14	46	101	157	62	46	800	10	8	50	1.1	1.3	15	1.8	400	3.0	1200	1200	300	18	15	150
	15-18	55	120	163	64	46	800	10	8	60	1.1	1.3	14	2.0	400	3.0	1200	1200	300	18	15	150
	19-22	55	120	163	64	44	800	7.5	8	60	1.1	1.3	14	2.0	400	3.0	800	800	300	18	15	150
	23-50	55	120	163	64	44	800	5	8	60	1.0	1.2	13	2.0	400	3.0	800	800	300	18	15	150
	51+	55	120	163	64	44	800	5	8	60	1.0	1.2	13	2.0	400	3.0	800	800	300	10	15	150
Pregnant						+30	+200	+5	+2	+20	+0.4	+0.3	+2	+0.6	+400	+1.0	+400	+400	+150	[8]	+5	+25
Lactating						+20	+400	+5	+3	+40	+0.5	+0.5	+5	+0.5	+100	+1.0	+400	+400	+150	[8]	+10	+50

1. The allowances are intended to provide for individual variations among most normal persons as they live in the United States under usual environmental stresses. Diets should be based on a variety of common foods in order to provide other nutrients for which human requirements have been less well defined.
2. Retinol equivalents. 1 retinol equivalent = 1 μg retinol or 6 μg β carotene.
3. As cholecalciferol. 10 μg cholecalciferol = 400 I.U. vitamin D.
4. α-tocopherol equivalents. 1 mg *d*-α-tocopherol = 1 α TE.
5. 1 NE (niacin equivalent) is equal to 1 mg of niacin or 60 mg of dietary tryptophan.
6. The folacin allowances refer to dietary sources as determined by *Lactobacillus casei* assay after treatment with enzymes ("conjugases") to make polyglutamyl forms of the vitamin available to the test organism.
7. The RDA for vitamin B-12 in infants is based on average concentration of the vitamin in human milk. The allowances after weaning are based on energy intake (as recommended by the American Academy of Pediatrics) and consideration of other factors such as intestinal absorption.
8. The increased requirement during pregnancy cannot be met by the iron content of habitual American diets nor by the existing iron stores of many women; therefore, the use of 30 to 60 mg of supplemental iron is recommended. Iron needs during lactation are not substantially different from those of nonpregnant women, but continued supplementation of the mother for 2 to 3 months after parturition is advisable in order to replenish stores depleted by pregnancy.

Table 2

Estimated Safe and Adequate Daily Dietary Intakes of Additional Selected Vitamins and Minerals[1]

		Vitamins			Trace Elements[2]						Electrolytes		
	Age (years)	Vitamin K (μg)	Biotin (μg)	Pantothenic Acid (mg)	Copper (mg)	Manganese (mg)	Fluoride (mg)	Chromium (mg)	Selenium (mg)	Molybdenum (mg)	Sodium (mg)	Potassium (mg)	Chloride (mg)
Infants	0-0.5	12	35	2	0.5-0.7	0.5-0.7	0.1-0.5	0.01-0.04	0.01-0.04	0.03-0.06	115-350	350-925	275-700
	0.5-1	10-20	50	3	0.7-1.0	0.7-1.0	0.2-1.0	0.02-0.06	0.02-0.06	0.04-0.08	250-750	425-1275	400-1200
Children	1-3	15-30	65	3	1.0-1.5	1.0-1.5	0.5-1.5	0.02-0.08	0.02-0.08	0.05-0.1	325-975	550-1650	500-1500
and	4-6	20-40	85	3-4	1.5-2.0	1.5-2.0	1.0-2.5	0.03-0.12	0.03-0.12	0.06-0.15	450-1350	775-2325	700-2100
Adolescents	7-10	30-60	120	4-5	2.0-2.5	2.0-3.0	1.5-2.5	0.05-0.2	0.05-0.2	0.1-0.3	600-1800	1000-3000	925-2775
	11+	50-100	100-200	4-7	2.0-3.0	2.5-5.0	1.5-2.5	0.05-0.2	0.05-0.2	0.15-0.5	900-2700	1525-4575	1400-4200
Adults		70-140	100-200	4-7	2.0-3.0	2.5-5.0	1.5-4.0	0.05-0.2	0.05-0.2	0.15-0.5	1100-3300	1875-5625	1700-5100

1. Because there is less information on which to base allowances, these figures are not given in the main table of the RDA and are provided here in the form of ranges of recommended intakes.
2. Since the toxic levels for many trace elements may be only several times usual intakes, the upper levels for the trace elements given in this table should not be habitually exceeded.

Food Groupings

The nutrient requirements of an individual or group of people may be met in many ways. Because no one food contains all the essential nutrients, it is important to eat a variety of foods every day. Food guides have been developed that group foods according to their nutrient content. In this country, a general guide for meeting nutritional needs is the Four Food Groups, or the Basic Four. The guide below suggests daily food requirements for persons of various ages.

The Basic Four is a clear, simple guide for dietary planning; however, its use has some limitations. Since the nutrient composition of specific foods within each food group varies, the Recommended Dietary Allowances for all nutrients are not always ensured, even when a person eats the recommended servings from each of the groups. Furthermore, technology has developed combination foods which usually do not contain enough of any one food group to be listed as a serving. Categorizing these foods into one or more of the groups is difficult.

In addition, the Basic Four does not classify food by types or amounts of protein, carbohydrate, or fat, which are also important considerations when one is planning the daily food intake. Although the Basic Four is a useful tool in meal planning, it does not completely satisfy the need to learn about the nutrient composition of foods.

Depending on selections within each group, the Basic Four will supply approximately 1,000 to 1,500 calories per day. Additional calories can be obtained if one eats larger portions than those specified or consumes moderate amounts of sweeteners and desserts.

Nutrition can be improved in different ways when food choices are made from the Basic Four. Whole grain products should be chosen from the Bread and Cereal Group. Vitamin C fruits and dark green leafy vegetables should be selected from the Fruit and Vegetable Group. Nonfat or low-fat products should be chosen from the Milk and Cheese Group; and vegetable protein foods, such as nuts, seeds, and legumes, should be included from the Meat, Poultry, Fish and Beans Group.

A food grouping system consisting of five food groups has recently been developed by the U.S. Department of Agriculture. In addition to the four food groups mentioned, a fifth group, Fats-Sweets-Alcohol, has been added. This group provides mainly calories and little in the way of nutrients. The important rule to be emphasized is that the diet should include a wide variety of foods that contribute the nutrients the body needs.

Food group	Number of servings suggested	Foods included in this food group
Milk and Cheese	Children under nine: 2 to 3 servings a day Children nine to twelve: 3 or more servings a day Teenagers: 4 or more servings a day Adults: 2 or more servings a day 1 serving is 8 oz. (240 mL) of milk or equivalent	Whole, evaporated, skim, and dry milk, buttermilk, cheese, ice cream, and yogurt (Remember, the milk group does not include butter or eggs.)
Meat, Poultry, Fish, and Beans	Two 2-3-oz. (84 g) cooked lean servings a day or 1 cup cooked dried beans or peas	Beef, veal, lamb, pork, liver, kidney, poultry, fish, eggs, dry beans and peas, lentils, nuts, seeds, and peanut butter
Fruit and Vegetable	Four ½-cup (120 mL) servings a day with one good source of vitamin C a day and one good source of vitamin A every other day	All fruits and vegetables
Bread and Cereal	Four servings a day	All breads and cereals that are whole grain, enriched, or restored, such as cornmeal, flour, macaroni, noodles, rice, and oatmeal; also those foods made from the above products, such as cornbread, muffins, crackers, and pancakes

Quiz

1. List the component parts of the Basic Four Food Groups and the number of servings that a preschool child should have from each group daily.

Food group	Number of servings

2. List three limitations of using the Basic Four as a guide for dietary planning.

_____

_____

_____

Answers

1. The number of servings that a preschool child should have from each of the Basic Four Food Groups is:

Food group	Number of servings
Milk and Cheese	2-3
Meat, Poultry, Fish and Beans	2
Fruit and Vegetable	4
Bread and Cereal	4

2. The following are limitations of the Basic Four as a guide for dietary planning:
   - Since nutrients vary for foods in specific groups, the RDA for all nutrients is not always ensured.
   - Foods are not classified by types or amounts of protein, carbohydrate, and fat, which are also important considerations in dietary planning.
   - It is difficult to categorize combination-type foods.

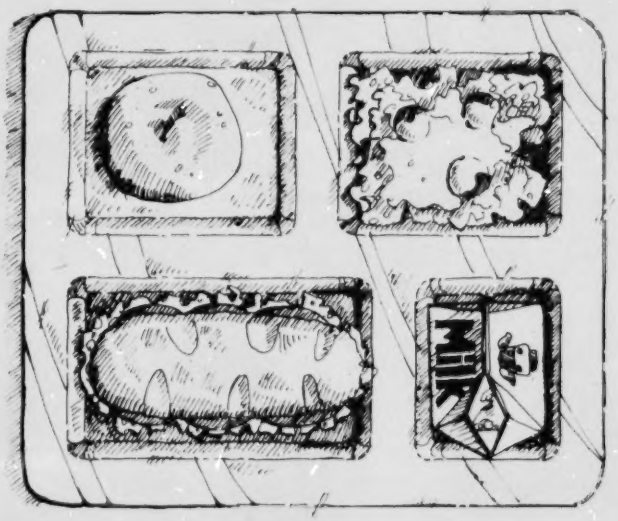
School Lunch Pattern

School food programs include the National School Lunch Program, the School Breakfast Program, the Child Care Food Program, the Special Milk Program, and the Summer Food Service Program for Children.

The National School Lunch Program serves nutritious, low-priced meals to children attending participating schools and residential child care institutions. Children from low-income families may receive lunches free or at a reduced price. Federal and state funds and federal commodities are provided to assist schools in the lunch and breakfast programs.

Lunches served at school are planned to meet the guidelines set by the United States Department of Agriculture (USDA). The school lunch pattern is based on the needs of a boy and girl, aged nine to twelve years (refer to Table 3, Group 4). To better meet the food and nutrition needs of all children, the USDA recommends, but does not require, that food portions be adjusted by age or grade group. If portions are not adjusted, school lunch programs must provide to all children the food portions listed for Table 3, Group 4.

Schools may also participate in the School Breakfast Program, which provides nutritious, low-priced breakfasts to children. Children from low-income families can receive breakfast free or at a reduced price. Since children who go to school hungry may find it difficult to stay alert and learn, the School Breakfast Program can help children attain their full potential, both mentally and physically.



Quiz

What are the four components of the school lunch pattern?

a. _____

b. _____

c. _____

d. _____

Answer

The four components of the school lunch pattern are:

a. Meat or meat alternate
b. Fruit and/or vegetable
c. Bread or bread alternate
d. Milk

Table 3
Minimum Food Quantities for Students Participating in the National School Lunch Program

Food	Minimum quantities, by grade level				
	Preschool		Kindergarten–grade 3, ages 5–8 (Group 3)	Grades 4–12, age 9 and over (Group 4)	Grades 7–12, recommended quantities (Group 5)
	Ages 1-2 (Group 1)	Ages 3-4 (Group 2)			
Meat or Meat Alternate					
A serving of one of the following or a combination to give an equivalent quantity:					
Lean meat, poultry, or fish (edible portion as served)	1 oz (28 g)	1½ oz (42 g)	1½ oz (42 g)	2 oz (56 g)	3 oz (84 g)
Cheese	1 oz (28 g)	1½ oz (42 g)	1½ oz (42 g)	2 oz (56 g)	3 oz (84 g)
Large egg	1	1	1	1	1
Cooked dry beans or peas	½ cup (118 mL)	½ cup (118 mL)	½ cup (118 mL)	½ cup (118 mL)	½ cup (118 mL)
Peanut butter	2 Tbsp (30 mL)	3 Tbsp (45 mL)	3 Tbsp (45 mL)	4 Tbsp (60 mL)	6 Tbsp (90 mL)
Vegetable and/or Fruit					
Two or more servings of vegetables or fruit or both to total	½ cup (118 mL)	½ cup (118 mL)	½ cup (118 mL)	¾ cup (177 mL)	¾ cup (177 mL)
Bread or Bread Alternate					
Servings of bread and bread alternate.	5 per week	8 per week	8 per week	8 per week	10 per week
A serving is:					
• 1 slice of whole grain or enriched bread					
• A biscuit, roll, muffin, etc., whole grain or enriched					
• ½ cup (118 mL) of cooked whole grain or enriched rice, macaroni, noodles, other whole grain or enriched pasta products, or other cereal grains, such as bulgur or corn grits					
• A combination of any of the above					
Milk					
A serving of fluid milk	¾ cup (6 fl oz) (180 mL)	¾ cup (6 fl oz) (180 mL)	½ pint (8 fl oz) (240 mL)	½ pint (8 fl oz) (240 mL)	½ pint (8 fl oz) (240 mL)
At least one of the following forms of milk must be offered:					
Unflavored lowfat milk					
Unflavored skim milk					
Unflavored buttermilk					

The Healthy Child

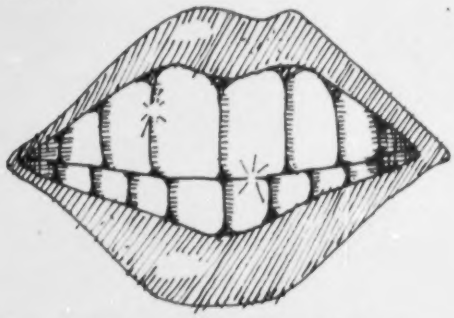
Healthy children have certain characteristics that are readily recognized:

- Good body posture
- Absence of aches and pains
- Bright eyes
- Shiny hair
- Sound teeth and gums
- Good appetite
- Good digestion and elimination
- Steady growth
- Correct weight for height
- Resistance to infection
- Alertness and interest
- Well-developed, firm muscles

Among the things children need to be healthy are adequate rest and exercise. In addition, they must eat the right kinds and amounts of food.

Two common, diet-related health problems in children are dental caries and obesity.

Dental caries represent the most widespread chronic disease in industrialized countries. Ancient man, in general, had relatively little dental decay, as do primitive people living today in various parts of the world. Dental caries are of bacterial origin initiated by acid decalcification of tooth enamel. Acid arises from the fermentation process of bacteria acting on carbohydrates. Poor dental hygiene and excessive consumption of sticky carbohydrate foods are contributors to dental caries.



Another diet-related health problem common to children is obesity. Most children form their eating habits and develop food attitudes by imitating other members of the family. Children from families where one or both parents are overweight have a 40 percent or more chance of becoming overweight themselves. This excessive weight usually results from a combination of both poor food choices that lead to overeating and a lack of exercise. Persons who become obese in childhood often stay obese as teenagers and as adults. They have a greater risk of developing hypertension, diabetes, and a number of other chronic diseases.

Quiz

1. List two characteristics of the healthy child.

   _____

   _____

2. Name two diet-related child health problems.

   _____

   _____

Answers

1. Some of the characteristics of a healthy child are good body posture, an absence of aches and pains, bright eyes, shiny hair, sound teeth and gums, good appetite, good digestion and elimination, steady growth, correct weight, well-developed muscles, and alertness and interest.

2. Obesity and dental caries are two diet-related child health problems.

Vegetarian Approach to Eating

Vegetarianism is one approach to eating, but this practice requires careful planning to ensure that the vegetarian obtains the essential nutrients for good health. People choose vegetarian diets for many reasons, some of which include religious beliefs, desire for better health, lower food costs, and ethical objections to animal slaughter. Vegetarian food habits are diverse and combine different foods.

Vegans are people who eat no animal foods. Meat, poultry, fish, eggs, and dairy products are not consumed. These vegetarians can obtain necessary nutrients to maintain good health if they take special care to include in the diet whole grain cereals, legumes, nuts, and nutlike seeds, as well as a wide variety of fruits and dark green vegetables. This variety is necessary to ensure that one has an adequate intake of essential amino acids and the more difficult to obtain vitamins and minerals. Vitamin B-12 may not be supplied when animal products are eliminated from the diet. This can cause a vitamin B-12 deficiency in vegans.

Lacto-vegetarians are people who include milk or milk products but exclude meat, poultry, fish, seafood, and eggs from their diets.

The ***lacto-ovo-vegetarian*** consumes dairy products and eggs but eats no flesh (e.g., meat, poultry, fish, or seafood). It is easier for the lacto-ovo-vegetarian to obtain the necessary nutrients to main-

tain good health, because foods included in the diet provide adequate amounts of protein, calcium, and B-vitamins. However, lacto-ovo-vegetarians and other types of vegetarians must give extra consideration to consuming adequate amounts of protein, vitamins, minerals, and energy-containing foods (calories). A well-planned diet, consisting of a variety of largely unrefined plant foods supplemented with some milk and eggs (lacto-ovo-vegetarian diet), meets all known nutrient needs.

Quiz

How can a vegetarian diet be adequate, balanced, and healthful?

_____

_____

_____

Answer

The vegetarian diet can be adequate, balanced, and healthful if one uses alternate animal protein sources (eggs, milk, or cheese) and takes special care in combining vegetable proteins in the diet (cereals, grains, legumes, nuts, or seeds).

Sources of Food

The two sources of food are plants and animals. Fruits, vegetables, nuts, seeds, and grains are derived from plants. The term *meat* refers to the edible portion of mammals, which include cattle, swine, and sheep. Also included with the term *meat* for nutritional consideration and meal-planning purposes are poultry and fish.

Fruits are botanically defined as seeds surrounded by edible tissue. However, for food preparation purposes, fruits are defined as fleshy or pulpy in character, often juicy, and usually sweet with fragrant, aromatic flavors.

Some foods that are usually considered as vegetables are actually fruits. Examples are tomatoes, squash, cucumbers, eggplant, okra, peppers, and pumpkins.

Fruits are valuable to the diet for their vitamin and mineral content. Yellow fruits contain carotenoid pigments that the body can break apart to form vitamin A. Citrus fruits are the most dependable all-year source of vitamin C.

Fruits

Apples
Apricots
Avocados
Bananas
Blackberries
Blueberries
Boysenberries
Cantaloupe
Casaba melons
Cherries
Cranberries
Crenshaw melons
Cucumbers
Currants
Dates
Eggplant
Elderberries
Figs
Gooseberries
Grapefruit
Grapes
Guava
Honeydew melons
Lemons
Limes
Loganberries
Mandarins
Mangoes
Nectarines
Okra
Olives
Oranges
Papayas
Peaches
Pears
Peppers
Persimmons
Pineapples

Plantains
Plums
Pomegranates
Prunes
Pumpkins
Raisins
Raspberries
Squash
Strawberries
Tangerines
Tomatoes
Watermelons

Botanically, vegetables are all the edible parts of the plant other than the fruit. Asparagus, celery, and kohlrabi are examples of the stem portion of plants. Cabbage, endive, lettuce, and spinach are the leaf part; and beets, carrots, potatoes, radishes, and turnips are edible roots. Artichokes, broccoli, and cauliflower are the flower portion of plants. Vegetables are valuable to the diet for the fiber, vitamins, and minerals they contribute. Dark green vegetables and yellow and orange vegetables contribute vitamin A to the diet.

Vegetables

Anise
Artichokes
Asparagus
Beans
Beets
Broccoli
Brussels sprouts
Cabbage
Carrots
Cauliflower
Celery
Chard
Collards
Corn
Dandelion greens
Endive
Garlic
Jicama
Kale
Lettuce
Mustard greens
Mushrooms
Onions
Parsley
Parsnips
Peas
Potatoes
Radishes
Rhubarb
Rutabagas
Shallots
Spinach
Sweet potatoes
Turnips
Turnip greens
Watercress
Yams

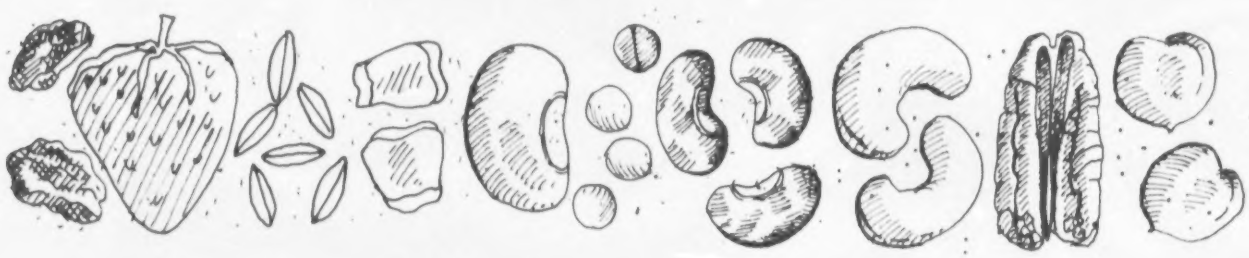
Examples of grains are corn, wheat, rice, oats, rye, barley, and buckwheat. Grains are milled to make the edible portions more accessible and to remove undesirable substances, such as dirt and insects. Such products as flour, meal, and breakfast cereals are produced from various grains. Grains are important to the diet for the energy, B vitamins, and incomplete protein they provide. In the usual methods of milling, most grains are ground finely, and the outer covering (bran) and the seed (germ) are removed. Some nutrients are lost in the milling process. Enrichment is a method in which some of the nutrients lost in the milling—iron, thiamin, riboflavin, and niacin—are put back into the product. Fortification is a method that adds nutrients to the food product in amounts that were not originally in the food before it was processed. Some breakfast cereals, for example, are fortified to provide 25 to 100 percent of the U.S. RDA of various vitamins and minerals, while some fruit drinks are fortified with vitamin C.

The roots of legumes have nodules which can take nitrogen in from the soil and use it to make protein. Therefore, legumes have a high protein content compared with other plant sources of food. Dried beans and peas (soybeans, pinto beans, lima beans, and other mature dried beans, cow peas, chick peas, green or yellow split peas, and lentils) are classified as legumes.

Nuts are hard-shelled fruits. They are similar to legumes in protein content; but, instead of having a high starch content as do legumes, they are high in fat (50—70 percent). Nuts, therefore, have a higher calorie value than comparable servings of legumes. Some common nuts are almonds, beechnuts, Brazil nuts, cashews, chestnuts, chenquopins, hazel nuts, macadamia nuts, pecans, pilinuts, pine nuts, pistachios, and walnuts. Peanuts are actually legumes because they have nodules that fix nitrogen.

Because nuts and legumes are relatively high in protein, they can be used as a meat substitute. However, since the proteins of nuts and legumes are generally low in one or more of the essential amino acids, they should be supplemented with protein from other foods.

In addition to protein, nuts and legumes are good sources of phosphorus, iron, and thiamin and a fair source of calcium and riboflavin.



Quiz

1. What are the two sources of food?

   _____

2. Name two plant foods that can be classified as follows:

   Fruit: _____

   Vegetable: _____

   Grain: _____

3. Name one food that is obtained from the following:

   A plant root: _____

   A plant stem: _____

   A plant leaf: _____

   A plant flower: _____

4. Describe the difference between enrichment and fortification.

   _____

   _____

Answers

1. Plants and animals are the two sources from which we obtain food to eat.

2. The following foods are classified as follows:

   Fruit: banana, apple
   Vegetable: broccoli, carrots
   Grain: wheat, barley

3. The following foods are obtained from the following:

   A plant root: beet
   A plant stem: celery
   A plant leaf: spinach
   A plant flower: cauliflower

4. Enrichment replaces some of the minerals and vitamins lost during processing, while fortification adds nutrients not originally present in food.

Chapter Three

Factors Influencing Food Choices

A close relationship exists between people's lifestyles and the foods they choose to eat. And eating patterns are formed by the interrelationship of physical, social, psychological, environmental, and cultural influences. Therefore, by providing an environment for children to try new and unfamiliar foods, schools have a tremendous opportunity to influence a child's nutritional habits. In addition, foods served at school parties or snack time can accentuate nutritious foods. Some examples of nutritional foods include fresh fruits, fresh vegetables, whole grain cereals, cheese, and milk drinks. Schools also can demonstrate ways to decrease food waste by having children select only the amount they think they can eat.

Students who participate in the school lunch program are provided with an opportunity to practice the nutrition education taught in the classroom. Students can participate in the school lunch program in several other ways, including: (1) making suggestions for lunch menus; (2) creating task forces that use posters or clean-up campaigns to improve the lunchroom environment; (3) working with food service personnel to develop nutrition education programs to acquaint students with the caloric and nutritional value of the school lunch and snack bar items; and (4) conducting student surveys for opinions and suggestions to improve the school lunch program.

Quiz

1. List two ways that classroom influences can affect a child's food selection practices.

_____

_____

_____

_____

2. Suggest four foods that could be served as alternatives to candy and soda at school parties.

_____

_____

3. What is one way to avoid being wasteful with food?

_____

_____

Answers

1. Two ways schools can influence a child's food selection practices are to provide examples of nutritious foods and to demonstrate ways to decrease food waste.

2. Some possible alternatives to "traditional" school party foods include fresh fruits, fresh vegetables, whole grain cereals, and cheese.

3. One way to avoid being wasteful with food is to have children select the amount which they think they can eat.

Food-Related Careers

Food is the nation's largest business. A total count of all the workers on the farm, in processing, transportation, retailing, and food service reveals that one out of every five workers in the United States is employed in this industry. Farming employs 4.3 million workers. Two million people have jobs in providing supplies that farmers use in food production. Seven million people are employed in food marketing, including those in canneries, meat packing plants, transportation, and local supermarkets. The food service industry employs cooks, waiters, dining room attendants, chefs, and food service managers.

Closely related to the food industry are the health professionals who provide information on food selection for general health. Some of these people include the dentist, doctor, nurse, nutritionist, and dietitian. These professionals work in medical offices, public health departments, cooperative extension offices, and state and local educational agencies.

Hospitals, schools, cafeterias, restaurants, homes for the convalescing and aging, industry, governmental agencies, and food processing plants are just a few of the places employing people interested in work related to food and nutrition. Career possibilities in these places of employment vary widely, ranging from those requiring limited skills to those requiring advanced graduate degrees.

Semiskilled Employment Opportunities

At the semiskilled level, employment opportunities exist for food service employees, such as dietetic aides, cooks, and bakers, who often work under the supervision of a dietitian and learn their skills on the job. In many large institutions, tasks for semiskilled

employees have become so specialized that job duties may be limited to preparing trays, serving patients or customers, or making salads. Caterers or vending machine companies often employ people whose primary task may be preparing sandwiches.

Skilled Employment Opportunities

At the skilled level, a food service manager may supervise a restaurant, school eating facility, or short-order drive-in. The manager is usually responsible for hiring, training, and supervising other employees.

A caterer plans, prepares, and serves special food for large groups, which may be entertained in a private home or public place. A type of catering service which is gaining in popularity is "Meals on Wheels." In this program, meals are prepared in a central kitchen and then taken to the residence of the elderly, infirmed, bed-ridden, or handicapped person. These programs offer opportunities for those who wish to do worthwhile volunteer service on a part-time basis.

Large food companies employ skilled and professional people to develop new products, recipes, and ways of using the company's products.

For people who enjoy traveling and who have earned a college degree in food and nutrition or home economics, employment opportunities are available in most states with the U.S. Department of Agriculture and with special interest groups, such as citrus growers, milk producers, and meat processors. Home economists employed by one of these agencies or special interest groups may travel extensively to demonstrate meal preparation and programs for selected audiences. They do various types of promotional work, such as preparing recipe booklets and brochures, conducting radio and television programs, and developing educational materials.

Food researchers, food technologists, and food chemists are employed by government agencies and privately owned companies to conduct experiments with natural and synthetic materials, to discover uses for the by-products of food processing plants, and to develop new food products.

Nutritionists

Nutritionists have specialized training in nutrition and often combine the biological bases of nutrition with social science. This interdisciplinary approach gives a person the understanding necessary to coordinate all the social and scientific factors involved in solving nutritional problems associated with community nutrition jobs. Many jobs in community nutrition require an advanced degree in nutrition, public health, or related fields. These jobs, whether in the areas of teaching, research, or nutritional programs, are within health, education, and social service agencies at local, state, national, and international levels.

Dietitians

Dietitians have specialized training in nutrition, biochemistry, food science, communication, and management techniques. To become a registered dietitian, a person must complete an internship or a program approved by the American Dietetics Association. Once dietitians are registered, they generally seek employment in administrative, therapeutic, teaching, research, or public health/public service positions in clinics, hospitals, schools, or other similar institutions. The role for dietitians is growing in settings other than health care institutions; for example, in state and federal nutrition programs, nutrition education, VISTA, Peace Corps, and cooperative extension work.

Quiz

1. Name two occupations in the food production and/or food handling industry.

   _____

   _____

2. Name two occupations in the food service industry.

   _____

   _____

3. Name two health professionals who provide advice on food selection in relation to dental and general health.

   _____

   _____

Answers

1. Occupations in the food production and/or food handling industry include the farmer, truck driver, processor, and storekeeper.

2. Some occupations in the food service industry include the cook, waiter, dining room attendant, chef, and food service manager.

3. Health professionals who provide advice on food selection in relation to dental and general health are the nutritionist, dietitian, doctor, nurse, and dentist.

Chapter Five

Consumer Competencies

Decisions about food influence all aspects of a person's well-being, and a person's economic well-being affects food choices and food availability. Satisfying the important need for food requires resources, whether they be thought of in terms of money or hours of labor. How adequately the need for food can be met depends on the extent of the resources, the cost of one's needs and desires, the decisions made concerning the priorities of needs, and the external influences of merchandising and mass media in modifying or initiating behaviors.

Labels are essential for getting foods from the manufacturer to the consumer. Without food labels, it would be impossible to determine the contents of a container or to know how the food item should be stored. Furthermore, federal law requires food labeling. All labels must show the brand name; product name; product ingredients, which are listed in order of the greatest proportions; net weight; lot number; expiration date; manufacturer's name and address; and, in some cases, nutritional information. Manufacturers need not list the ingredients on a product for which there is an identity standard if the product meets the standard. Examples of standard foods include milk, cheese, ice cream, margarine, certain seafoods, sweeteners, salad dressings, and mayonnaise.

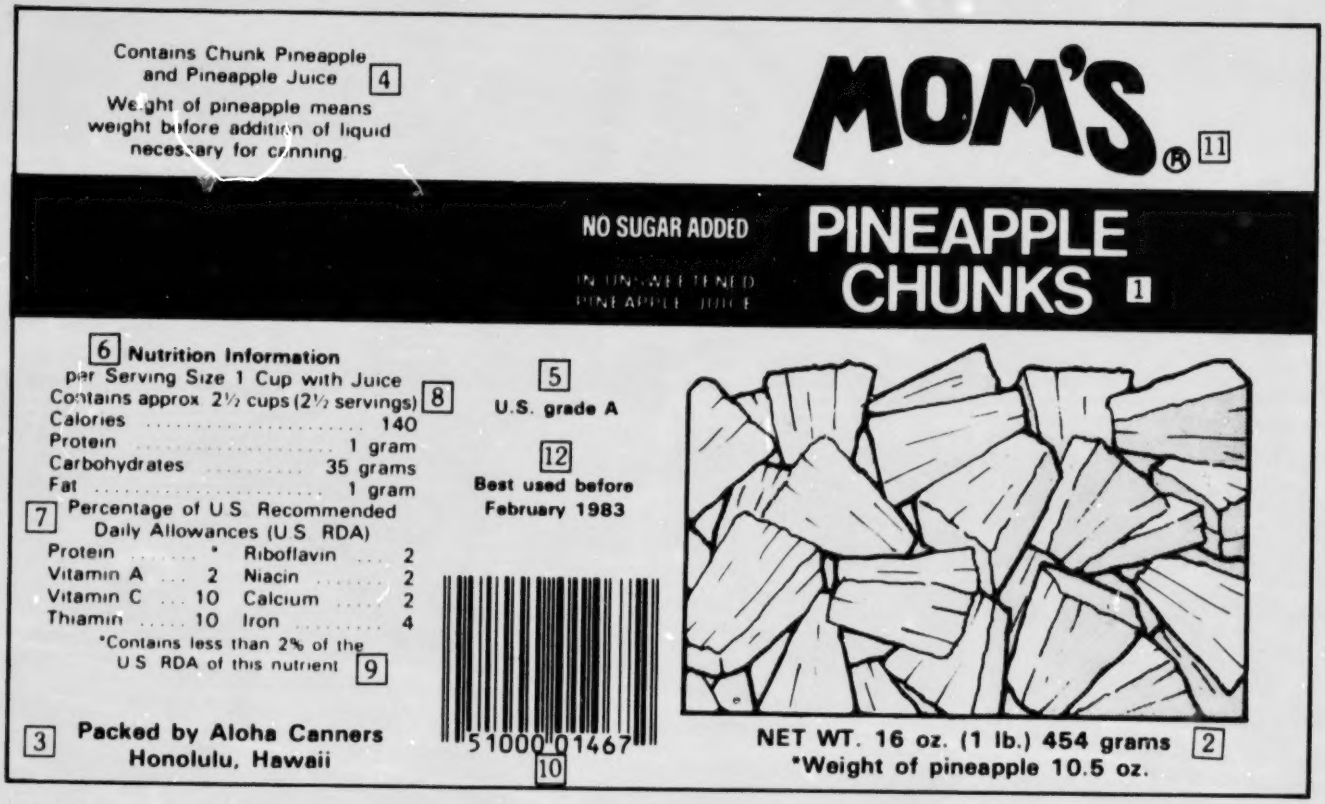
Nutritional labeling must appear on any product in which a nutrient has been added or for which a nutritional claim has been made. The labels on foods that have nutrients added during manufacturing, such as vitamin-enriched or protein-fortified foods, will have the nutritional information listed on the basis of serving size. The number of calories and the grams of protein, carbohydrate, and fat will be listed per portion. The percentage of the U.S. Recommended Daily Allowances for protein, vitamin A, vitamin C, thiamin, riboflavin, niacin, calcium, and iron per serving also will be stated on the labels for packaged foods. Nutritional labeling allows one to compare the nutrient value of various foods to determine which foods are particularly good sources of various nutrients. New foods can be compared easily with familiar foods.

Labeling, a form of advertising, is communication from a manufacturer or seller to the consumer about the product. Other forms of advertising, such as television and newspapers, also inform consumers about available products and give information enabling consumers to make comparisons.

However, not all advertising is considered favorable by consumers. Many of them believe that it increases the price of a product and does not give enough information for them to make valid decisions. Furthermore, many kinds of advertising are thought to be persuasive rather than informational.

Advertising directed at young children is a special concern. Some evidence shows that they do not know that the purpose of the ad is to entice viewers to buy the products. Young children also may not be able to distinguish between the program content and the commercial. Some people maintain that these facts are reasons why all advertising of food products to young children is unfair.

Nutrition education, in the meantime, can assist children to recognize the purpose of and techniques used in food advertising and help them to realize how advertising influences their food habits.


Contains Chunk Pineapple and Pineapple Juice 4
Weight of pineapple means weight before addition of liquid necessary for canning
MOM'S® 11
NO SUGAR ADDED
IN UNSWEETENED PINEAPPLE JUICE
PINEAPPLE CHUNKS 1
6 Nutrition Information
per Serving Size 1 Cup with Juice
Contains approx 2½ cups (2½ servings) 8
Calories 140
Protein 1 gram
Carbohydrates 35 grams
Fat 1 gram
7 Percentage of U S Recommended Daily Allowances (U S RDA)
Protein * Riboflavin 2
Vitamin A 2 Niacin 2
Vitamin C 10 Calcium 2
Thiamin 10 Iron 4
*Contains less than 2% of the U S RDA of this nutrient 9
5
U.S. grade A
12
Best used before February 1983
51000 01467
10
NET WT. 16 oz. (1 lb.) 454 grams 2
*Weight of pineapple 10.5 oz.
3 Packed by Aloha Canners
Honolulu, Hawaii

1. The name of the product must be on all food labels as well as variety, style, and how the product is packed.
2. The net contents or net weight, including liquid, must be on all food labels.
3. The name and place of business of the manufacturer, packer, or distributor must be on all food labels.
4. On most foods, the ingredients must be listed on the label, and they must be listed in descending order with the ingredients of greatest quantity by weight listed first.
5. Some food products carry a grade on the label.
6. Nutrition information is required if the product says "enriched" or "fortified" or makes any other nutritional claim.
7. Percent U.S. RDA is required on all foods that say "enriched" or "fortified" or that make any nutritional claim, except fresh bakery goods, raw fruits and vegetables, and unprocessed dairy products. The label has to have the percent of protein, vitamin A, thiamin, riboflavin, niacin, vitamin C, calcium, and iron in one serving.
8. Serving information includes the size of the serving and how many servings are in the can.
9. An asterisk (*) means the food contains less than 2 percent of the nutrient in one serving.
10. Many food labels now include a small block of parallel lines of various widths with accompanying numbers for computerized check-outs and inventories.
11. The symbol ® on a label signifies that the trademark used on the label is registered with the U.S. Patent Office.
12. To help consumers obtain fresh and wholesome food, many manufacturers open date their product or use code dating on products that have a long "shelf life."

Also required:
If the product is below government standards, it must say "imitation."
If any artificial flavor, color, or preservative is used, it must be noted on the label.

Fig. 1 Typical Label on Canned Food

Quiz

1. Where in the list of ingredients on a food label does the main ingredient appear?

2. What is one benefit of nutritional labeling?

3. List one positive and one negative influence of advertising on food selection.

Answers

1. The first ingredient listed on a food label is the main ingredient of the product. The label lists the ingredients in the order of decreasing amounts.

2. Some benefits of nutritional labeling are that it allows one to compare various food products. One can determine which foods are high in particular nutrients, and one can compare new products with familiar ones.

3. Some positive influences of advertising are that it communicates about products, makes consumers aware of what is available on the market, and provides information for consumers to use in making comparisons with similar products. Some negative influences of advertising are that it is persuasion; it increases the cost of products; and it does not really provide enough information for consumers to make adequate comparisons.

Food Handling

No food, no matter how nutritious or good-tasting, can benefit individuals if it is unsafe. The handling, processing, and preparing of foods affect their safety and quality.

Those involved in food production and preparation are responsible to society for ensuring that foods are safe for consumption. Proper and safe food storage, preparation, protection, and use of additives must be the major concern of those in food-related careers.

Food Storage

Even though most food fresh from the farm or ranch is high in nutrients, some of its nutritional value can be lost through improper storage and preparation methods. All fresh foods should be stored at the proper temperature. For most fresh fruits, meats, vegetables, fish, and dairy products, proper storage means refrigeration. Dry foods, such as rice and dried beans, should be stored away from heat and dampness. Most fresh foods should be eaten as soon as possible, because, even under ideal storage conditions, they retain their top quality for only a short while. Most foods store best in airtight containers.

Food Preparation

Some preparation methods that help foods retain their nutritional value are:

- Cook foods that are high in water-soluble vitamins in as little water and for as short a time as possible.
- Cook root and tuber vegetables in their skins.
- Help retain the nutritional value of foods by baking, steaming, or stir-frying them.

Not only must one take care when storing and preparing foods to retain their nutritional values, but one also must observe proper sanitation practices while preparing the food. Food-borne illnesses can be caused by contamination of foods with certain bacteria, such as clostridium botulinum, salmonella, and staphylococcus. Foods most susceptible to contamination include meats, meat salads, egg products, cream-filled desserts, and low-acid canned foods.

An example of a method to prevent the spread of bacteria is to wash thoroughly any board used for cutting poultry before putting another kind of food on that same board.

Bacteria, which are typically one-celled, grow and multiply constantly. They need food, moisture, temperatures from 40 degrees Fahrenheit (4 degrees Celsius) to 140 degrees Fahrenheit (60 degrees Celsius),

and time to grow and multiply. Bacteria can thus be controlled by maintaining temperatures below 40 degrees Fahrenheit, by cooking food above 165 degrees Fahrenheit (73 degrees Celsius), and by not letting ready-to-serve food stand at room temperature. Refrigerate food immediately after use.

One should always wash his or her hands before handling food and be sure to use clean equipment. All food preparation surfaces should be cleaned with hot, soapy water and rinsed well. To reduce food contamination, those who prepare food should wear clean clothes and have their hair pulled back.

Food Protection

All foods must be dirt- and germfree. Foods must be properly processed and packaged to retain their freshness until the consumer uses them. The sanitation and safety of manufactured foods in the United States are checked with standards established by the Food and Drug Administration.

Manufacturing equipment, working areas, and workers are inspected for cleanliness and must meet government sanitation and safety regulations. State and local public health inspectors check both the interior and exterior of buildings to ensure the maintenance of these standards.

The United States Department of Agriculture has established voluntary food grading regulations which many manufacturers use. Once foods have been graded for quality, they are stamped with an insignia, which is a must for certain products purchased by many restaurants, hospitals, and other institutions that buy foods wholesale. Therefore, many manufacturers have found it profitable to use this government service.

Food Additives

Food additives are chemicals added to improve and maintain the quality of foods on the market. Some of the various reasons for the use of additives are to improve the nutritive value of foods, to add to their flavor and color, to prolong their storage life, and to improve their texture.

Some people oppose the use of additives in food. One objection is that they increase the price of food. Some people object to food additives because they feel they are unnecessary and may be unhealthful. The Food and Drug Administration is responsible for monitoring the safety of food additives.

Quiz

1. What are two home food storage practices that help retain the nutritional value of foods?

2. What are two home preparation methods that help retain the nutritional value of vegetables?

3. What are two sanitation practices that should be used when food is prepared in the classroom?

4. List one benefit and one problem associated with the use of food additives.

5. Name one government agency that is responsible for food protection.

Answers

1. Some home food storage practices that help food retain its nutritional value are storing fresh food at proper temperatures, storing dry foods away from heat and dampness, using fresh foods as soon as possible, and storing food in airtight containers.

2. Some home preparation methods that help vegetables retain their nutritional value are cooking vegetables in as little water and for as short a time as possible, cooking them in their skins, and steaming, baking, or stir-frying them.

3. Some sanitation practices that should be used when food is prepared in the classroom are washing the hands, maintaining clean utensils and work surfaces, wearing clean clothes, and keeping the hair pulled back.

4. Some benefits of the use of additives in foods are their improved nutritional quality, added flavor and color, prolonged life, and improved texture. Some problems are increased costs because of their use and research findings that some additives may be unhealthful or unnecessary.

5. Some of the agencies responsible for food protection are state and local health departments, the Food and Drug Administration, and the United States Department of Agriculture.

Other Publications Available from the Department of Education

Nutrition Education–Choose Well, Be Well: A Resource Manual for Preschool, Kindergarten, and Elementary Teachers is one of approximately 450 publications that are available from the California State Department of Education. Some of the more recent publications or those most widely used are the following:

California Private School Directory	$5.00
California Public School Directory	12.50
California Public Schools Selected Statistics	1.50
California's Demonstration Programs in Reading and Mathematics (1980)	2.00
Discussion Guide for the California School Improvement Program (1978)	1.50*†
District Master Plan for School Improvement (1979)	1.50*
Eating Habits of Students in California Public Schools, A Summary (1981)	2.50
Establishing School Site Councils: The California School Improvement Program (1977)	1.50*†
Guidelines and Procedures for Meeting the Specialized Health Care Needs of Students (1980)	2.50
Guidelines for School-Based Alcohol and Drug Abuse Programs (1981)	1.00
Handbook for Planning an Effective Reading Program (1979)	1.50*
History–Social Science Framework for California Public Schools (1981)	2.25
Improving the Human Environment of Schools (1979)	2.50
Nutrition Education–Choose Well, Be Well: A Resource Manual for Preschool, Kindergarten, and Elementary Teachers (1982)	2.25
Nutrition Education–Choose Well, Be Well: A Resource Manual for Secondary Teachers (1982)	2.25
Nutrition Education–Choose Well, Be Well: A Curriculum Guide for Preschool and Kindergarten (1982)	3.75
Nutrition Education–Choose Well, Be Well: A Curriculum Guide for the Primary Grades (1982)	3.75
Nutrition Education–Choose Well, Be Well: A Curriculum Guide for the Upper Elementary Grades (1982)	3.75
Nutrition Education Today: Curriculum Design for Nutritional Knowledge and Food Use, Secondary and Adult Education (1981)	2.50
Planning a Publicity Campaign (Nutrition Education Training Program packet) (1981)	2.00
Putting It Together with Parents (1979)	.85†
Reading Framework for California Public Schools (1980)	1.75
The Relationship Between Nutrition and Student Achievement, Behavior, and Health (1980)	4.00
Science Framework for California Public Schools (1978)	1.65
School Improvement: Making California Education Better (brochure) (1981)	NC*
Simplified Buying Guide (1981)	1.50
Student Achievement in California Schools	1.75
Students' Rights and Responsibilities Handbook (1980)	1.50†

Orders should be directed to:

California State Department of Education
P.O. Box 271
Sacramento, CA 95802

Remittance or purchase order must accompany order. Purchase orders without checks are accepted only from government agencies in California. Sales tax should be added to all orders from California puchasers.

A complete list of publications available from the Department may be obtained by writing to the address listed above.

†Also available in Spanish, at the price indicated.
*Developed for implementation of School Improvement.

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